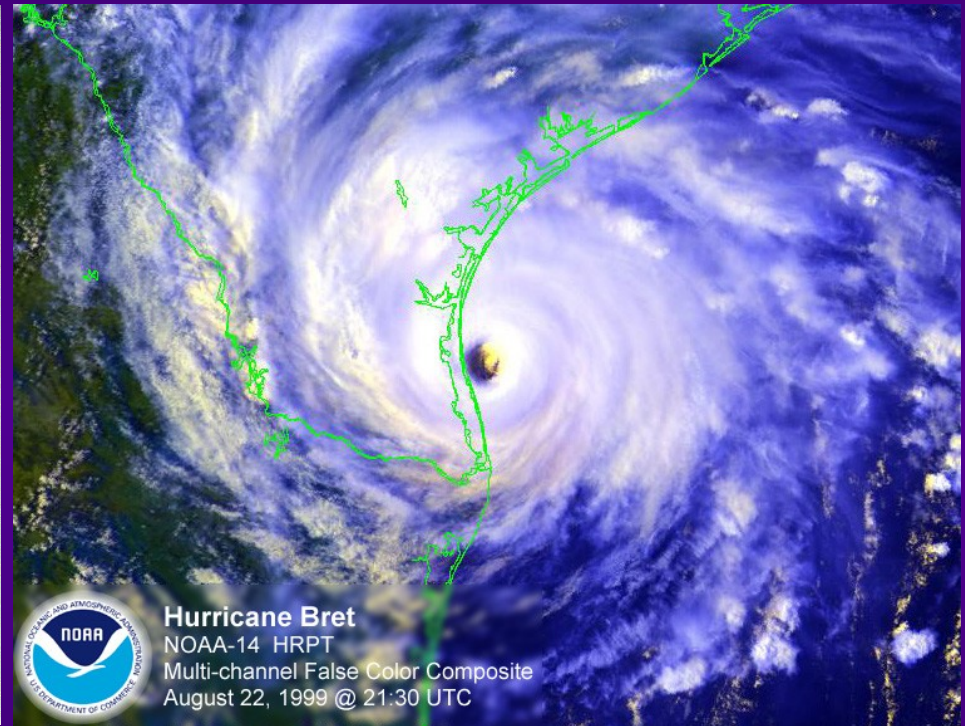
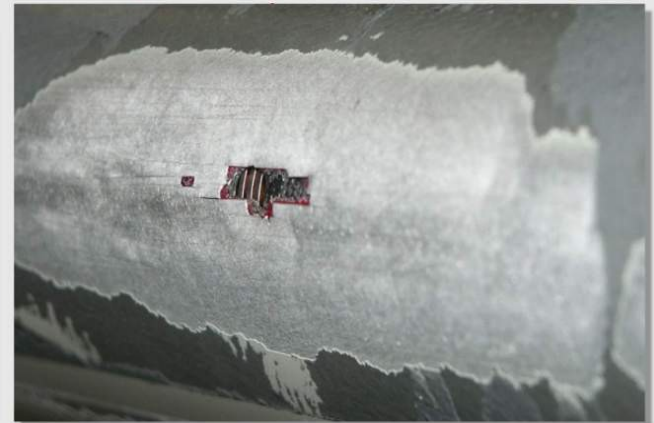


NS Ingleside 2002 Hurricane Briefing



2002 Hurricane Season







TROPICAL CYCLONE FORMATION

2002 ATLANTIC TROPICAL CYCLONE NAMES

2002 Hurrex
6-17 May

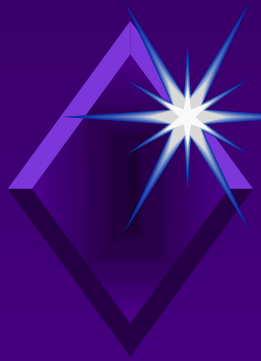
Atlantic Season
**01 June - 30
November**

Arthur	Isidore	
Rene		
Bertha	Josephine	
Sally		
Cristobal	Kyle	Teddy
Dolly	Lili	Vicky
Edouard	Marco	
Wilfred		
Fay	Nana	
Gustav	Omar	



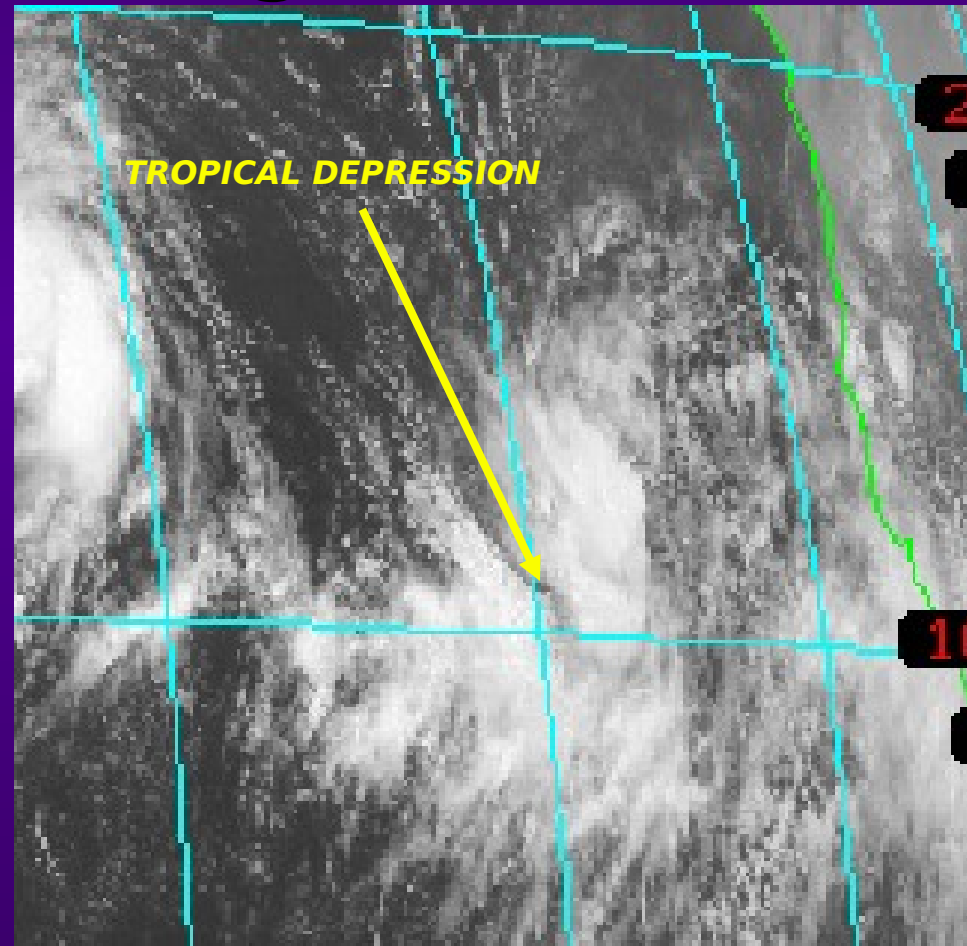
WATCHES AND WARNINGS

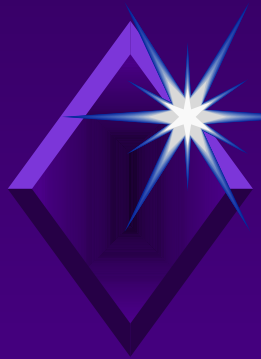
- ◆ **TROPICAL STORM WATCH:** Issued when tropical storm conditions are POSSIBLE in the specified area of the watch, usually within 36 hours.
- ◆ **TROPICAL STORM WARNING:** Issued when tropical storm conditions are EXPECTED in the specified area of the warning, usually within 24 hours.
- ◆ **HURRICANE WATCH:** Issued when hurricane conditions are POSSIBLE in the specified area of the watch usually within 36 hours. During a hurricane watch, activate your family's emergency plan and begin to prepare for a hurricane.
- ◆ **HURRICANE WARNING:** Issued when hurricane conditions are EXPECTED in the specified area, usually within 24 hours. Complete all storm preparations and evacuate if directed by local officials.



TROPICAL DEPRESSION *(Formative Stage)*

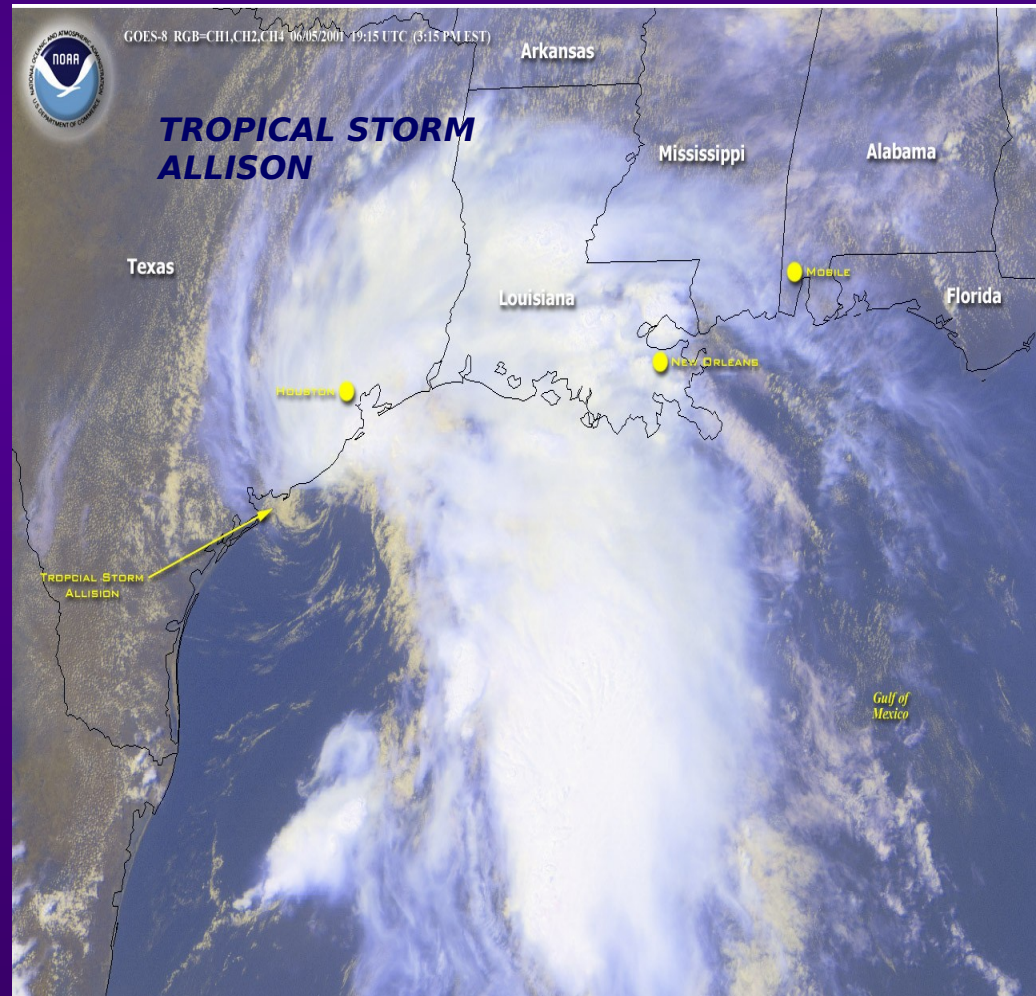
- ◆ winds < 34 kts
- ◆ tropical wave develops a **weak cyclonic circulation**
- ◆ identified by **thickening clusters of tstms** on satellite
- ◆ central **pressure falls rapidly** below 1002mb or system intensifies

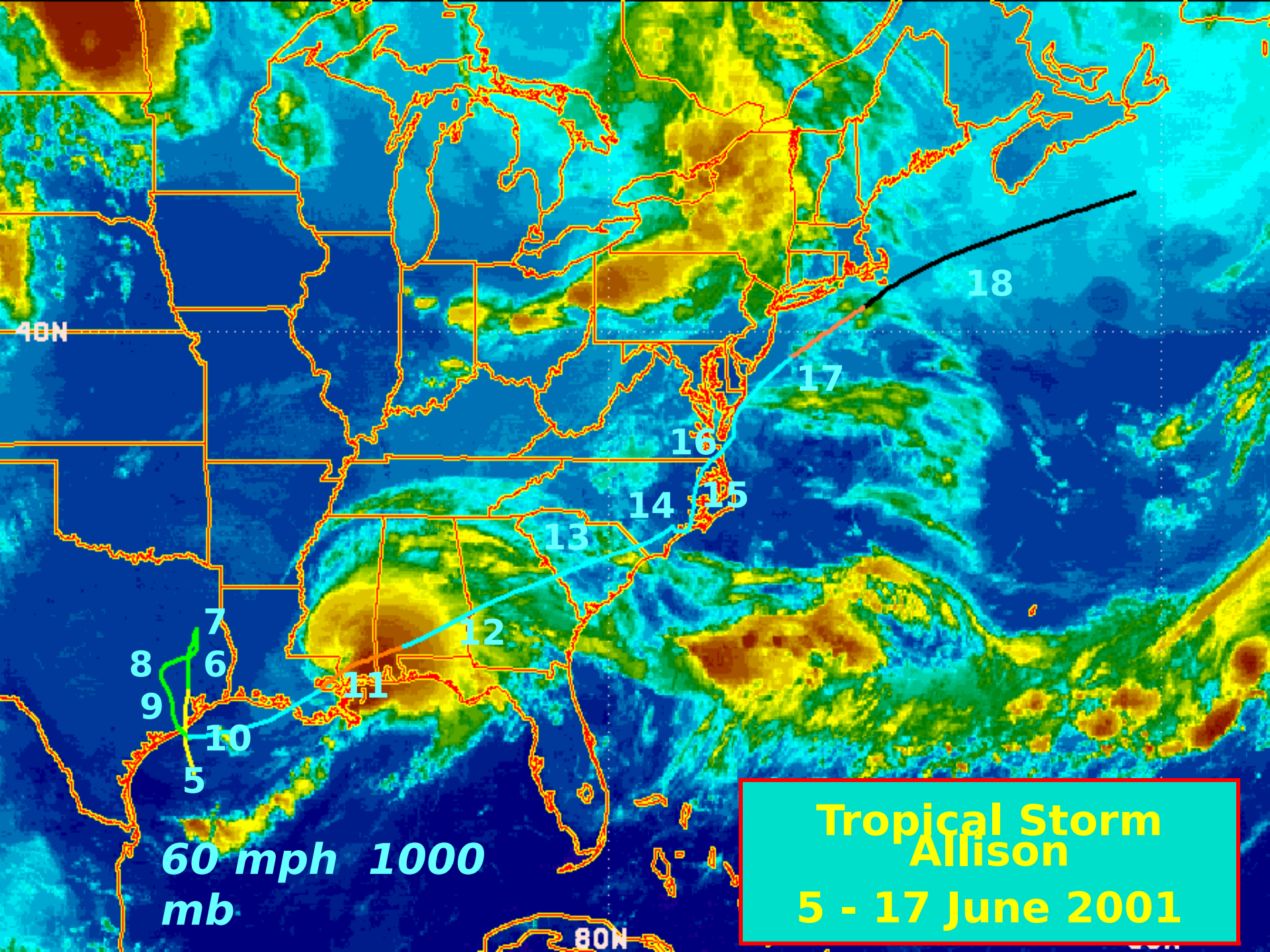




TROPICAL STORM (Immature to Mature Stage)

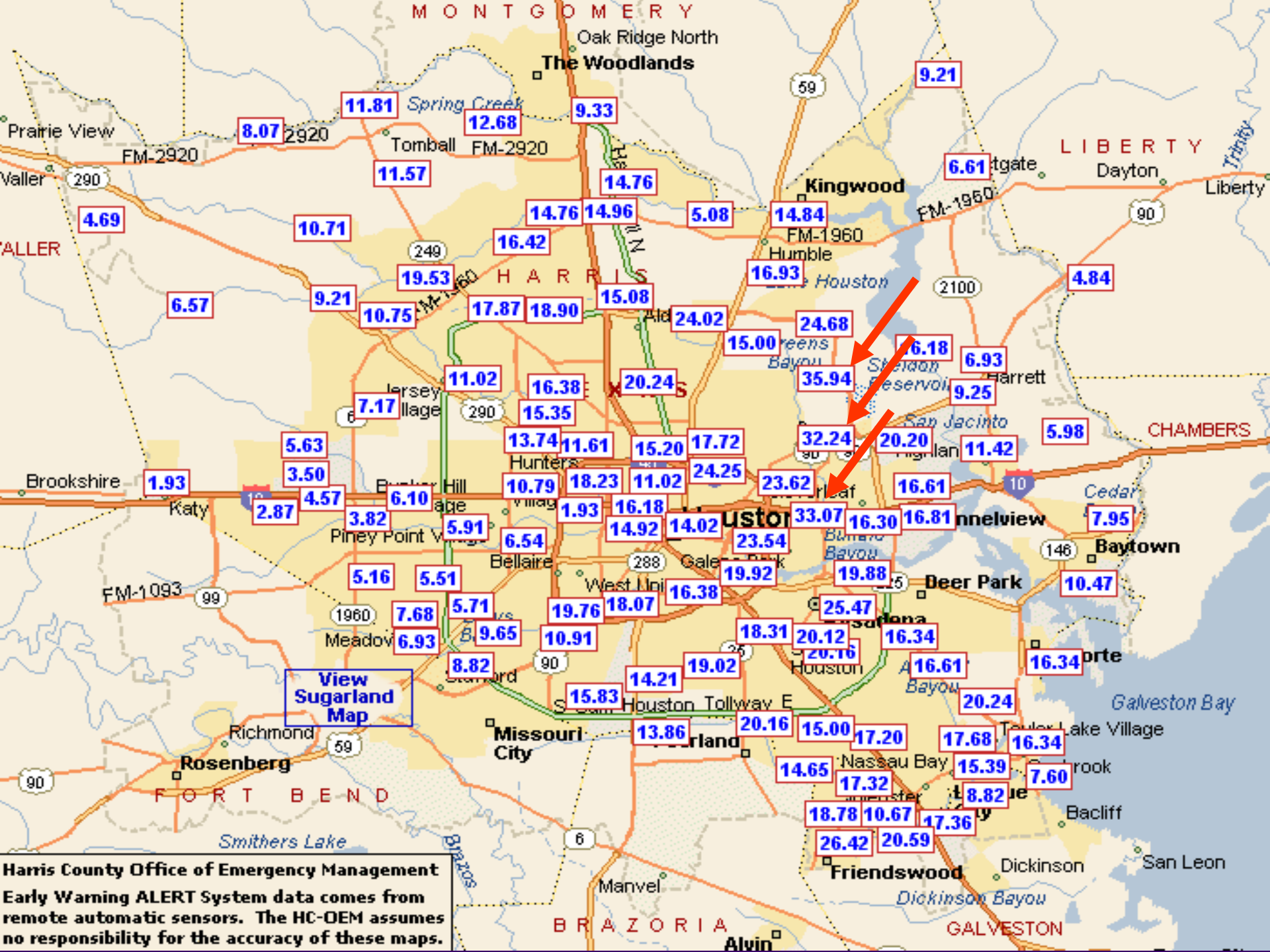
- ◆ winds 34 - 63 kts
- ◆ closed formation expands with **spiral bands** becoming better organized
- ◆ **increasing sea state** makes navigation near the center increasingly difficult and dangerous



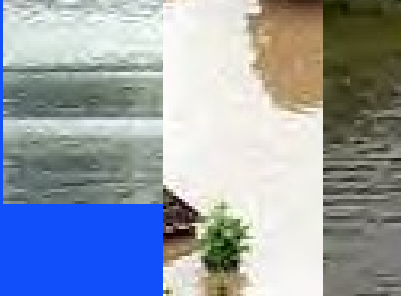


60 mph 1000
mb

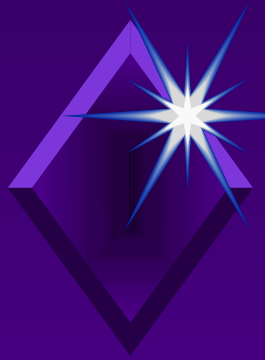
**Tropical Storm
Allison
5 - 17 June 2001**



Harris County Office of Emergency Management
Early Warning ALERT System data comes from
remote automatic sensors. The HC-OEM assumes
no responsibility for the accuracy of these maps.

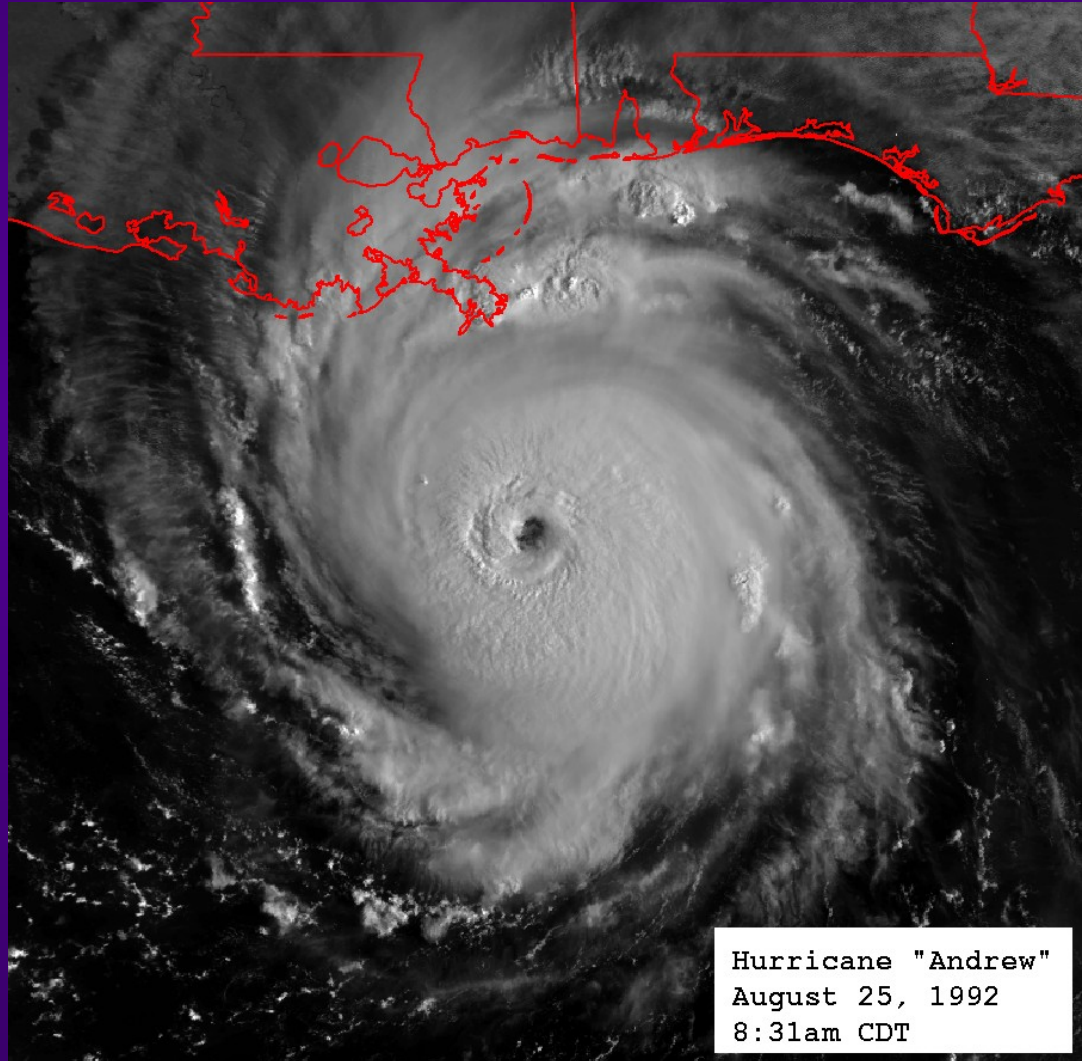


Houston, TX



HURRICANE (Mature Stage)

- ◆ winds > 63 kts
- ◆ **DANGEROUSLY HIGH SEAS** severely impairs navigation
- ◆ radius of strong winds may exceed 350 NM
- ◆ Gale Force Winds extend out further in right front quadrant (typically 120 NM)



Hurricane "Andrew"
August 25, 1992
8:31am CDT



Saffir-Simpson Scale

Once a tropical cyclone reaches hurricane strength (winds of 74 mph, or 64 knots), it is placed into one of five categories to reflect wind speed and associated storm surge. The National Hurricane Center and the National Weather Service use the Saffir-Simpson Scale for the categorization of hurricanes.



HURRICANE CATEGORIES

Category 1 (Minimal) - Winds 74-95 mph (64 -82 knots), storm surge 4 to 5 ft above normal. No real damage to building structures. Low lying coastal areas flooded; minor damage to piers.

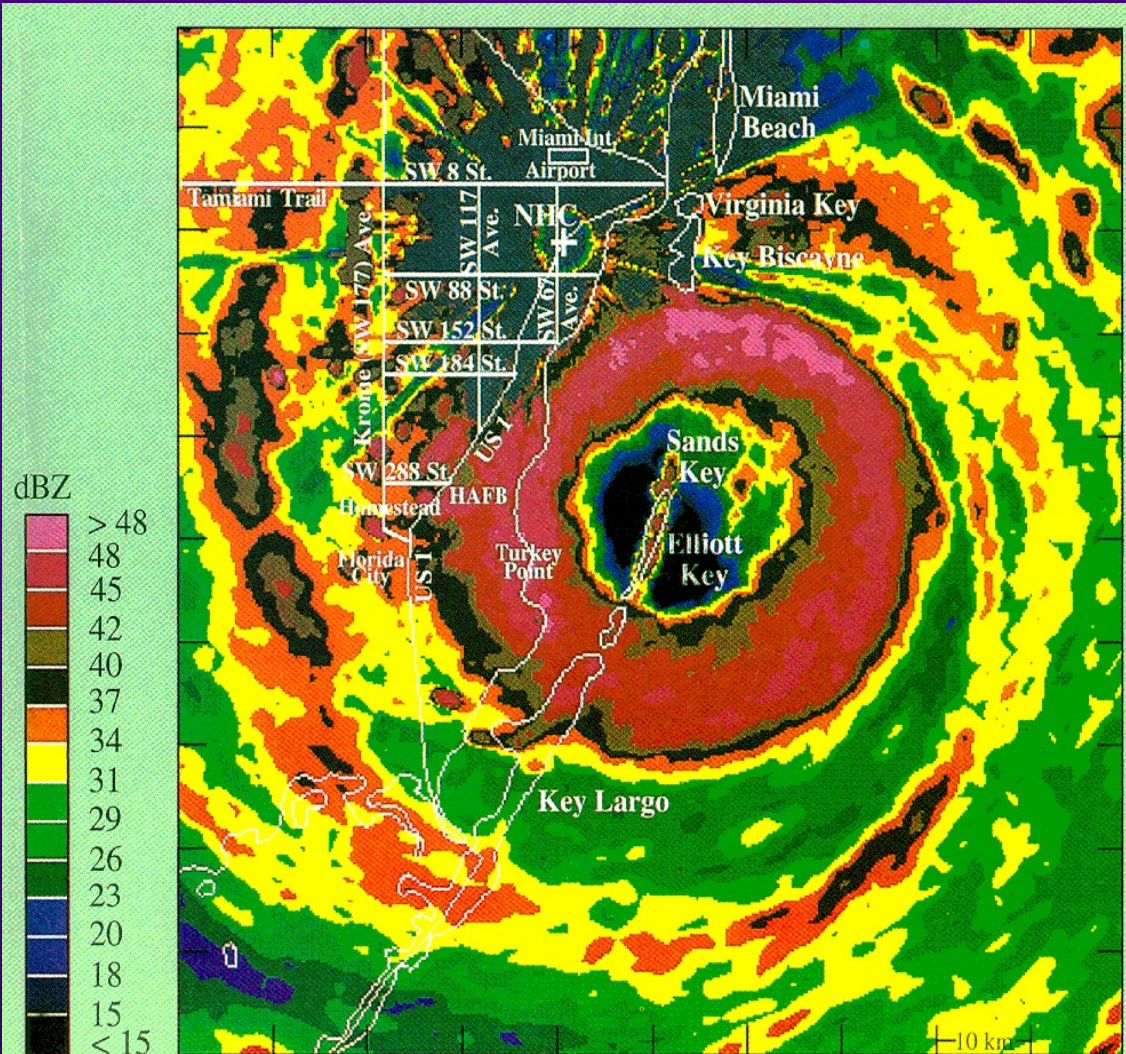
Category 2 (Moderate) - Winds 96-110 mph (83-95 knots), storm surge 6 to 8 ft above normal. Minor damage to structures, poorly constructed buildings major damage. Coastal and low lying escape routes flooded over; considerable pier damage.

Category 3 (Extensive) - Winds 111-130 mph (96-113 knots), storm surge 9 to 12 ft above normal. Major damage to structures, poorly constructed buildings destroyed. Serious flooding along the coast; extensive flooding may extend inland up to 8 miles.

HURRICANE CATEGORIES

Category 4 (Extreme) - Winds 131-155 mph (114-135 knots), storm surge 13 to 18 ft above normal. Extensive roofing and window damage, complete destruction of mobile homes. Areas above 10 ft flooded inland up to 6 miles, major erosion of beaches, massive evacuation of coastal areas.

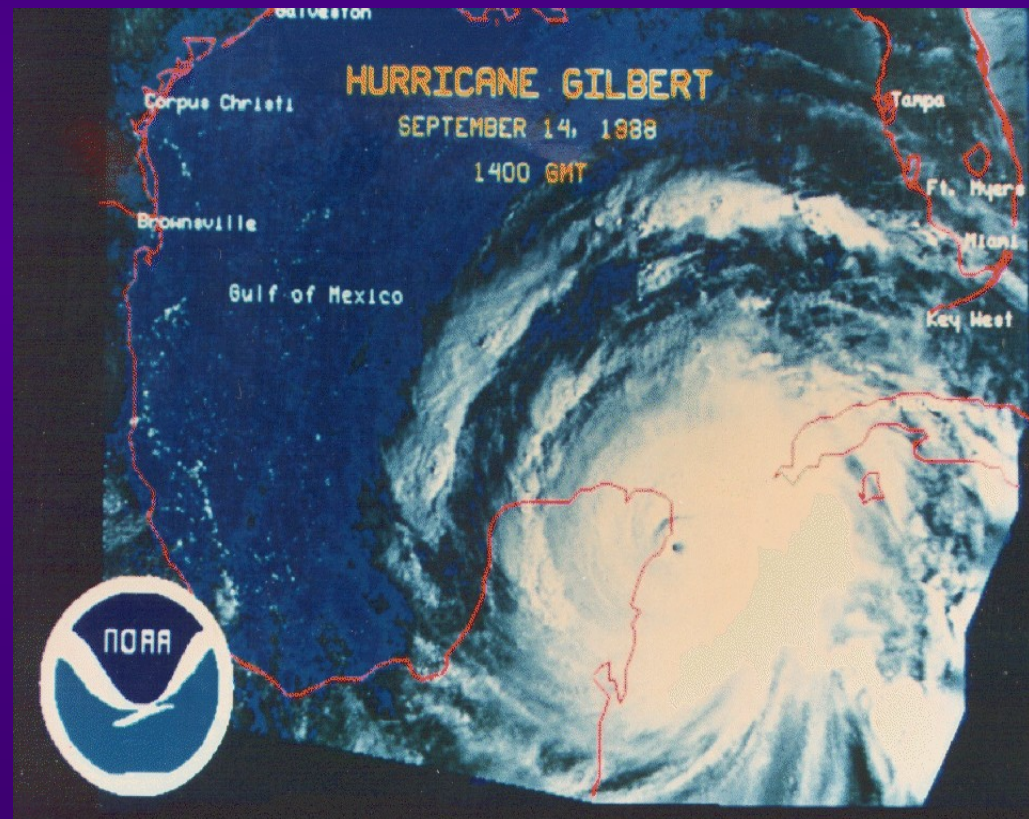
(ANDREW 1992)

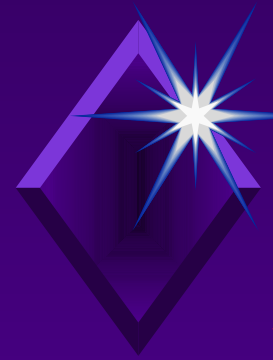




HURRICANE CATEGORIES

Category 5
(Catastrophic) - Winds above 155 mph, (135 knots), storm surge greater than 18 feet above normal. Complete failure of roof structures and very severe window and door damage, some complete buildings fail. Major damage to structures lower than 15 ft above sea level, massive





MOST DANGEROUS ASPECT OF HURRICANES

Storm Surge:

Abnormal rise of the sea in advance/with the cyclone formed by the cyclone's onshore winds to the right of the cyclone center and low pressure near the cyclone's center.

"V"





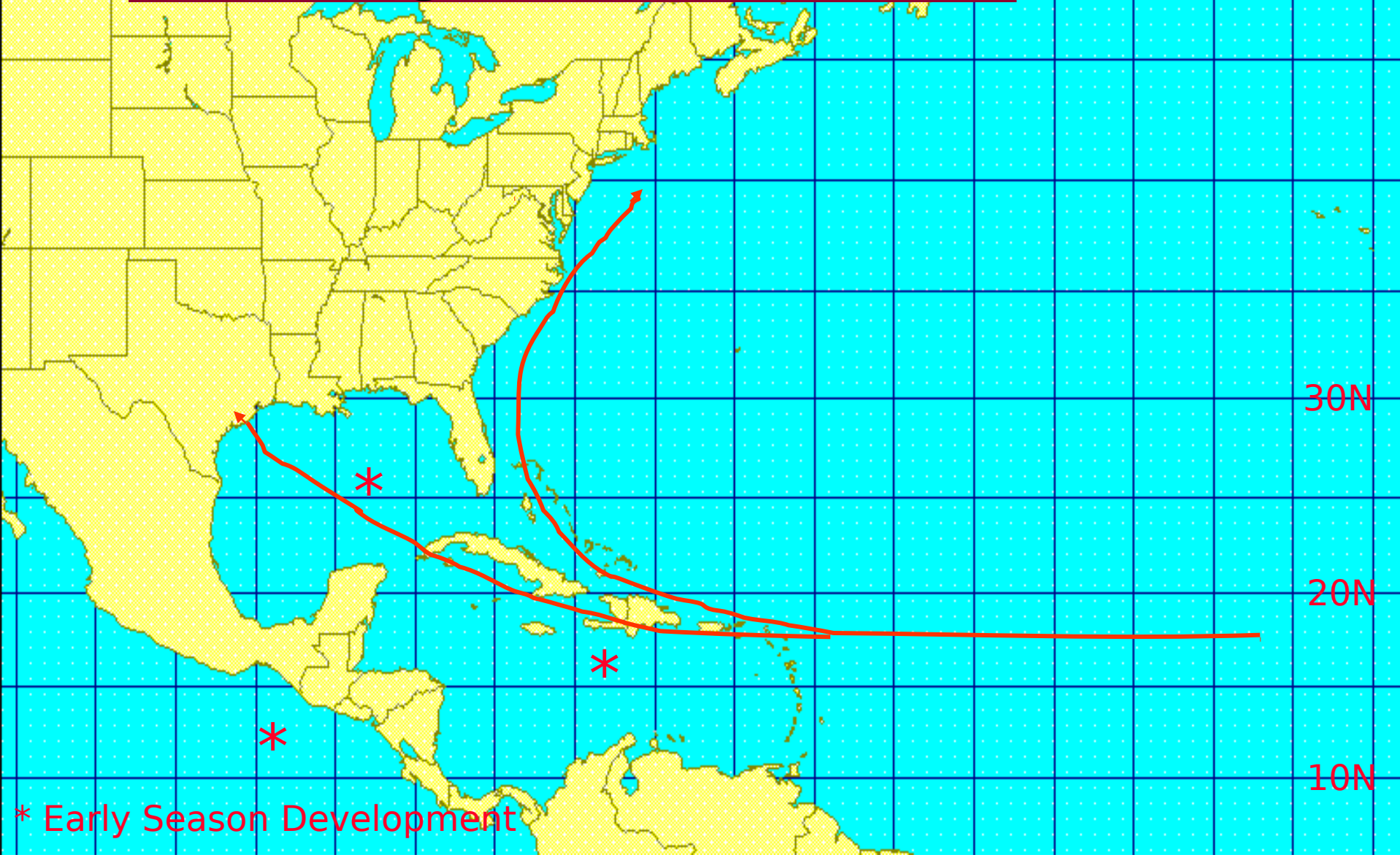
The Eye

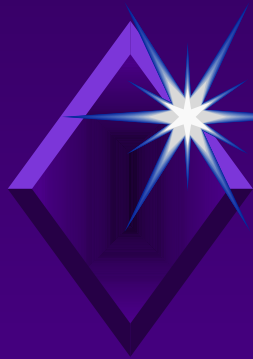


- ♦ At the center of a hurricane is the "eye". Within the eye, the wind becomes light and precipitation ceases. The air in the eye gradually descends and heats by compression. This descending air helps to negate clouds from forming within the eye; however, the descending air is not usually strong enough to produce a totally cloud-free eye zone. As a result, scattered and broken cloud layers are common within a hurricane's center.
- ♦ Typical eye diameters are between 5 and 50 miles wide. Usually, when an eye becomes large it is a sign that a hurricane may be weakening. Likewise, when the eye shrinks, it is probable that the hurricane may be intensifying.
- ♦ Some people may become fooled by the eye and venture outside thinking that the hurricane had passed. They are then caught off-guard when the second half of the storm and the other half of the eye wall (the area just around the eye associated with the strongest winds in hurricanes) approaches.

***** Beware the eye of the hurricane*****

AREAS OF POTENTIAL DEVELOPMENT





Hurricane Facts

The Deadliest U.S. Hurricanes

Deaths	Hurricane	Year	Category
	1. Galveston TX	1900	4
	2. Florida	1928	4
	3. Florida Keys	1919	4

The Costliest U.S. Hurricanes

Damage	Hurricane	Year	Category
\$25,000,000,000	1. Andrew	1992	4
	2. Hugo	1989	4
	3. Fran	1996	3

The Most Intense U.S. Hurricanes

Millibars (Inches)	Hurricane	Year	Category
	1. Florida Keys	1935	5
	2. Camille	1969	5



Texas Hurricane Facts

Hurricanes and Texas Coastal Hits Since 1900

- **Galveston** county is the most affected Texas coastal county by hurricanes. In fact since 1900, **Galveston** county experienced **18 total hits** (**5 indirect** and **13 direct**).
- **Cameron** county is the least affected Texas coastal county by hurricanes. Only **7 total hits** (**2 indirect** and **5 direct**) have been recorded.
- **Nueces**, **Matagorda**, and **Brazoria** counties experienced the most *total hits* from major hurricanes...**8 total hits**.
- **Jefferson**, **Cameron**, **Calhoun**, **Jackson**, and **Orange** counties experienced the least *total hits* from major hurricanes...**4 total hits**.



Texas Hurricane Facts ...

Hurricanes and Texas Coastal Hits Since 1900

- *Direct hits by major hurricanes by county:*

Brazoria...7

Galveston...5

Nueces/Kenedy/Matagorda/Chambers/Aransas...4

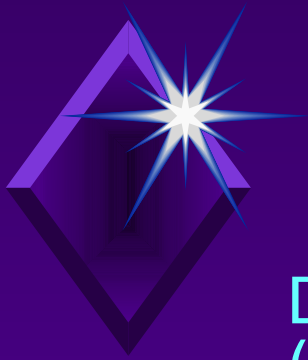
Cameron/Willacy/Kleberg/Refugio/Harris...3

Jackson/San Patricio...2

Orange/Calhoun...1

Jefferson...0

- Not one Category 5 hurricane has struck the Texas coastline.
- **Brazoria** county experienced the most *direct hits* by Category 4 hurricanes...4 total. Landfalls occurred in 1900, 1915, 1932, and 1961(Carla).
- There have only been 4 hurricanes in the past 36 years to affect the Coastal Bend Region of the Texas coast: Hurricane Celia (1970), Hurricane Fern (1971), Hurricane Allen (1980) and Hurricane Bret (1999).



Results from 2001

Dr. Gray's Initial/Last Forecast (7 Dec 00) / (7 Aug 01)	Observed
Named storms: 9/12	15
Hurricanes: 5/7	9
Cat 3 or higher: 4/5	5

Some Facts about 2001 Hurricane Season

- ◆ First season w/ nine hurricanes forming after 8 S
- ◆ First season w/ three hurricanes in Nov (Highest
- ◆ First time there have been 19 consecutive hurric
a U.S. landfall. Probability is less than 1/10 of 1
(Irene 1999 was last) (Bret 1999 last to hit Texa



2002 Atlantic Seasonal Hurricane Forecast

• Dr. William Gray noted Professor of Atmospheric Sciences

7 Dec/5 Apr revised forecast

	Forecast	Average (1950-2000)
Named Storms	13/12	9.6
Hurricanes	8/7	5.9
Category 3 or greater	4/3	2.3

PROBABILITY OF ONE OR MORE MAJOR (CATEGORY 3-4-5) HURRICANE
LANDFALL IN THE FOLLOWING COASTAL AREAS:

- 1) Entire U.S. coastline - 75% (average for last century is 52%)
- 2) U.S. East Coast Including Peninsula Florida - 57% (average for last century is 31%)
- 3) ***Gulf Coast from the Florida Panhandle westward to Brownsville - 43%
(average for last century is 30%)***
- 4) Expected above-average major hurricane landfall risk in the Caribbean.

Note: **All probabilities are up from last year**

Conditions of Readiness (COR SET BY SOPA - CMWC)

- **COR V: Awareness condition effective 1 June.**
- **COR IV: Destructive winds (>35 Kts) within 72 hrs.**
- **COR III: Destructive winds within 48 hrs.**
- **COR II: Destructive winds within 24 hrs.**
- **COR I: Destructive winds within 12 hrs.**

**See SOPA(ADMIN) INGLESIDEINST 5400.1C
CH-5**

**Sortie Commander Ingleside is CTG 183.4
(CLF 152004Z APR 02)**



NOAA 11 HRST
Multi-channel False Color Composite
August 22, 1999 @ 21:30 UTC



INTERNET

- ◆ Lots of useful information out there

“Our Favorites”

- NTMOD Corpus Christi

www.ntmof.navy.mil/ngp/homepage.htm

- NWS Corpus Christi

www.srh.noaa.gov/crp/docs/wx101/watch/watch2.html

- National Hurricane Center

www.nhc.noaa.gov/index.html

QUESTIONS??



Hurricane Bret

NOAA-14 HRPT

Multi-channel False Color Composite

August 22, 1999 @ 21:30 UTC